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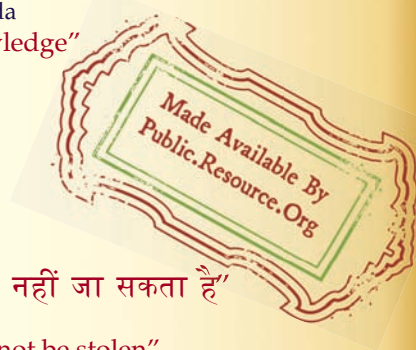
IS 2330 (2011): Metallic Materials - Tube - Flanging Test
[MTD 3: Mechanical Testing of Metals]



“ज्ञान से एक नये भारत का निर्माण”

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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
धात्विक सामग्री — नलिका — फ्लैन्जिंग परीक्षण
(दूसरा पुनरीक्षण)

Indian Standard
METALLIC MATERIALS — TUBE — FLANGING TEST
(*Second Revision*)

ICS 77.040.10

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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NATIONAL FOREWORD

This Indian Standard (Second Revision) which is identical with ISO 8494 : 1998 'Metallic materials — Tube — Flanging test' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Mechanical Testing of Metals Sectional Committee and approval of the Metallurgical Engineering Division Council.

This standard was originally published in 1963 and revised in 1986. This revision of the standard has been taken up to align it with ISO 8494 : 1998 by adoption, under dual numbering system.

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards the current practice is to use a point (.) as the decimal marker.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

METALLIC MATERIALS — TUBE — FLANGING TEST (Second Revision)

1 Scope

This International Standard specifies a method for determining the ability of metallic tubes of circular cross-section to undergo plastic deformation during flange formation.

This International Standard is intended for tubes having an outside diameter no greater than 150 mm and a wall thickness no greater than 10 mm, although the range of diameters or wall thickness for which this International Standard is applicable may be more exactly specified in the relevant product standard.

2 Symbols, designations and units

Symbols, designations and units for the flanging test of tubes are given in table 1 and are shown in figure 1.

Table 1

Symbol	Designation	Unit
a^a	Wall thickness of the tube	mm
D	Original outside diameter of the tube	mm
D_u	Maximum outside diameter of the flange	mm
L	Length of the test piece before the test	mm
R	Corner radius of the flanging tool	mm
β	Angle of the conical mandrel	degree

^a The symbol T is also used in steel tube standards.

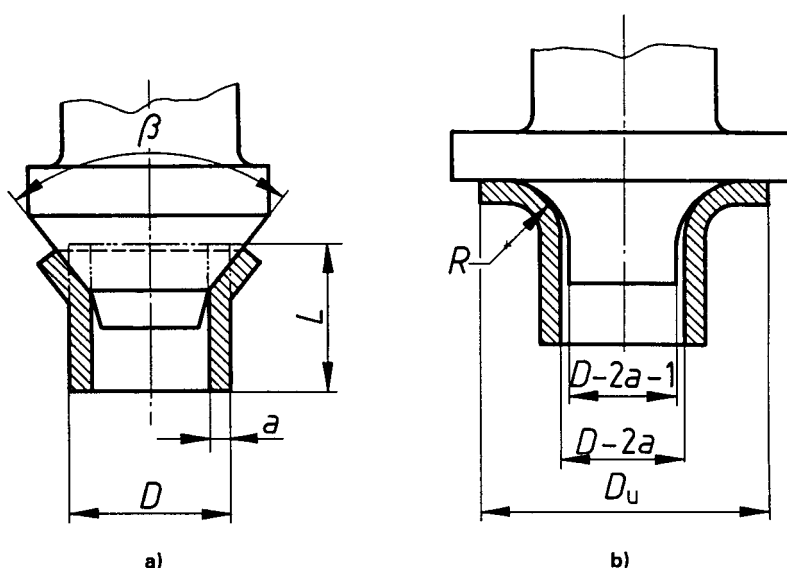


Figure 1

3 Principle

Forming of a flange on the end of a test piece cut from the tube, in a plane perpendicular to the axis of the tube, until the external diameter of the flange reaches the value specified in the relevant product standard.

4 Testing equipment

4.1 Variable-speed press or universal testing machine.

4.2 Forming equipment, made of polished material of sufficient hardness, consisting of

- a) a conical mandrel having a suitable angle (generally 90°);
- b) a flanging tool having
 - a cylindrical end of a diameter 1 mm less than the inside diameter of the tube;
 - a flat concentric portion, perpendicular to the axis of the flanging tool, and having a diameter no less than the required diameter of the flange;
- c) a supporting die, which may be used to support the tube during the formation of the flange.

5 Test piece

5.1 The length of the test piece shall be approximately 1,5 D . The test piece may be shorter provided that the remaining cylindrical part of the test piece after flanging is at least 0,5 D .

5.2 Both ends of the test piece shall be in the plane perpendicular to the axis of the tube. The edges of the end to be tested may be rounded by filing or chamfered by other methods.

NOTE — Non-rounded or non-chamfered edges are permissible if the test result meets the test requirements.

5.3 When welded tubes are subjected to the test, the internal welded flash may be removed.

6 Procedure

6.1 In general, the test shall be carried out at ambient temperature within the limits of 10 °C to 35 °C. The test carried out under controlled conditions shall be made at a temperature of 23 °C $\pm$ 5 °C.

6.2 Preform the test piece by forcing the conical mandrel into one end of the test piece until the diameter of the drifted test pieces is such that a flange having the specified diameter can be formed [see figure 1 a)].

6.3 Remove the conical mandrel and, if necessary, replace it with the flanging tool [see figure 1 b)].

6.4 Form the flange by applying axial force to the test piece until the drifted portion has formed a flange of the required diameter perpendicular to the axis of the test piece.

6.5 The conical mandrel may be lubricated. The conical mandrel shall not rotate relative to the test piece during the test.

6.6 In case of dispute, the rate of movement of the forming tools shall not exceed 50 mm/min.

6.7 The diameter of the flange and the radius R shall be as specified in the relevant product standard.

6.8 Interpretation of the flanging test shall be carried out in accordance with the requirements of the relevant product standard. When these requirements are not specified, the test piece shall be considered to have passed the

test if no cracks are visible without the use of magnifying aids. Slight cracking at the edges shall not be considered cause for rejection.

7 Test report

A test report shall be provided when so specified in the relevant product standard. In this case, the test report shall include at least the following information:

- a) reference to this International Standard, i.e. ISO 8494;
- b) identification of the test piece;
- c) dimensions of the test piece;
- d) maximum outside diameter of the expanded part of the test piece, D_u , or relative expansion as a percentage of the original diameter, D ;
- e) corner radius R of the flanging tool, when relevant;
- f) result of the test.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.org.in

Regional Offices:

Telephones

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: SCO 335-336, Sector 34-A, CHANDIGARH 160022	{ 260 3843 260 9285
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	{ 2254 1216, 2254 1442 2254 2519, 2254 2315
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